

Acarina of the families Anystidae, Pseudocheylidae and Cheyletidae (Prostigmata) found associated with plants in South Africa.

by

MAGDALENA K. P. MEYER

Division of Entomology, Pretoria

and

P. A. J. RYKE

Institute for Zoological Research, Potchefstroom
University for C.H.E., Potchefstroom

ABSTRACT.

Three new species are described and figured. These are: *Anandia bathurstensis*, *Becksteinia grahami* and *Chaussieria capensis*. The following known species are also described: *Anystis baccarum* (Linn.); *Neocheylis natalensis* Trägårdh; *Cheyletia wellsi* Baker and *Cheletomorpha lepidopterorum*. (Shaw). Keys to the genera and species of Anystidae, Pseudocheylidae and Cheyletidae associated with South African plants are given.

INTRODUCTION.

The mites described in the present paper are probably all predacious. They were collected in various parts of South Africa and intensified investigations might prove them to be of economic importance. All recorded collections were made by the authors unless otherwise noted. The types of the new species are deposited in the collections of the Institute for Zoological Research, Potchefstroom University. Acknowledgments are due to the South African Council for Scientific and Industrial Research as well as the Department of Agriculture of the Union of South Africa for financial assistance. The authors also wish to record their gratitude to Prof. G. T. S. Eiselen and Dr. J. A. van Eeden for reading the manuscript.

Superfamily **ANYSTOIDEA** Cunliffe, 1955.

The thumb-claw complex is distinctive of this superfamily. The chelicerae are hinged posteriorly so that they are free to move laterally; the movable

Family ANYSTIDAE Oudemans, 1902.

This family can be divided into two subfamilies: Anystinae Oudemans, 1936 and Erythracarinae Oudemans, 1936.

1. Short, broad, with two pairs of eyes; palpal tibia with three claws
 Subfamily **ANYSTINAE**

a. Body square or trapezoidal; propodosomal plate (75μ long, 240μ broad) rounded in front; posterior margin conspicuously indented; length of body (excluding gnathosoma) 1094μ ; length (including gnathosoma) 1263μ ; breadth of body 964μ **A. baccarum** (Linn.)

- Longer than broad; with one to two pairs of eyes; palpal tibia with one smooth claw or two feathered claws Subfamily **ERYTHRACARINAE** 2
2. Dorsum with numerous setae; propodosomal plate fairly large and with setae on or near its margin; tarsi with false articulations; coxae close together **Anandia** Hirst.
- a. Relatively large triangular propodosomal plate with fourteen pairs of setae on or near its margins; length of body (excluding gnathosoma) 1297 μ ; length (including gnathosoma) 1641 μ ; breadth of body 667 μ **A. bathurstensis** n.sp.
- Dorsum with ten to twelve pairs of setae; propodosomal plate (when present) not very large and with few setae 3

3. Propodosomal plate absent; peritremata directed posteriorly; chelicera with one distal seta; coxae in two slightly separated groups
 **Bechsteinia** Oudemans.
 - a. Integumental striations forming three diamond shaped figures in the median region of the hysterosoma; length of body (excluding gnathosoma) 974 μ ; length (including gnathosoma) 1223 μ ; breadth of body 600 μ **B. grahami** n.sp.
- . Propodosomal plate present; peritremata ω shaped; chelicera with two setae; coxae touching along median line; four pairs of lentiform organs are present **Chaussieria** Oudemans
 - a. Propodosomal plate pentagonal; palpal tarsus shorter than the remainder of palp; length of body (excluding gnathosoma) 1018 μ ; length (including gnathosoma) 1536 μ ; breadth 673 μ
 **C. capensis** n.sp.

Subfamily ANYSTINAE Oudemans, 1936

The members of this subfamily can readily be recognised by the palpal tibia which is provided with three claws; two pairs of eyes are present; the body is short and broad.

Genus ANYSTIS Von Heyden, 1826.

Oudemans (1936) considered *Actineda* Koch, 1836 as synonymous with *Anystis* and diagnosed the latter by means of the following characteristics: Anteriorly the propodosomal plate is more or less hexagonal and posteriorly it is impressed; it is broader than long. Two small plates, each provided with a seta, are situated near the posterior half of the genital opening

Anystis baccharum (Linn.), 1758 (Figs.1-5).

Anystis baccharum is a reddish mite with a characteristic square or trapezoidal shape.

Female (fig. 1).

Dimensions: Length of body (excluding gnathosoma) 1094 μ ; length (including gnathosoma) 1263 μ ; breadth of body 964 μ .

Dorsum. The suture between the propodosoma and hysterosoma is absent. Anteriorly the propodosoma bears a small rounded plate (epivertex) which is provided with two pseudostigmatic organs. The peritreme is located at the base of the chelicerae. The propodosoma is provided with a plate (striations absent or differentiated). The plate is rounded in front and is 75 μ long and 240 μ broad; its posterior margin is indented. It bears three pairs of setae; the anterior pair are slightly shorter and thinner than the other pairs. Two eyes are present on each side of the body.

Medially, the striations on the hysterosoma are arranged in the form of a V. The hysterosoma bears seven pairs of setae. All the dorsal setae are finely setose (fig. 2).

Venter. The genital opening (fig. 3) is flanked by six setae.

Gnathosoma. The palpal tibia is provided with three claws (fig. 4). The palpal tarsus bears about fourteen strong setae and a short spine. The chelicerae are broad basally and gradually narrow to their distal ends. The distally situated movable chela is hooklike.

Legs. The legs radiate from the body and the coxae are grouped together. All the legs are richly covered with setae. The tarsi are each provided with combed claws and a bell-like empodium (fig. 5). Two brush-like setae are situated at the base of the claw.

Habitat and locality. *Anystis baccharum* is commonly found in Europe and Australia. According to Womersley (1933) it is common in the countryside around Cape Town. It is predacious on other mites and many small insects.

Specimens were collected from *Pelargonium* sp., and *Carica papaya*, Nelspruit (Tvl.) April 1955; wild legume, Grabouw (Caledon Distr., C.P.); unidentified wild shrub, Pretoria (Tvl.) January 1956; *Lilium longiflorum*, Potchefstroom (Tvl.) October 1955; *Pirus communis*, Buxton (Fort Beaufort Distr., C.P.) January 1956; *Musa sapientum*, Munster (Pt. Shepstone Distr., Nat.) April 1955; soil and grass, Bathurst (Albany Distr., C.P.) June 1956; *Protea* sp., Western Cape Province.

Subfamily ERYTHRACARINAE Oudemans, 1936.

This subfamily can be identified by the following characteristics: The body is longer than broad and may be provided with one or two pairs of eyes. The palpal tibia bears either one smooth or two feathered claws.

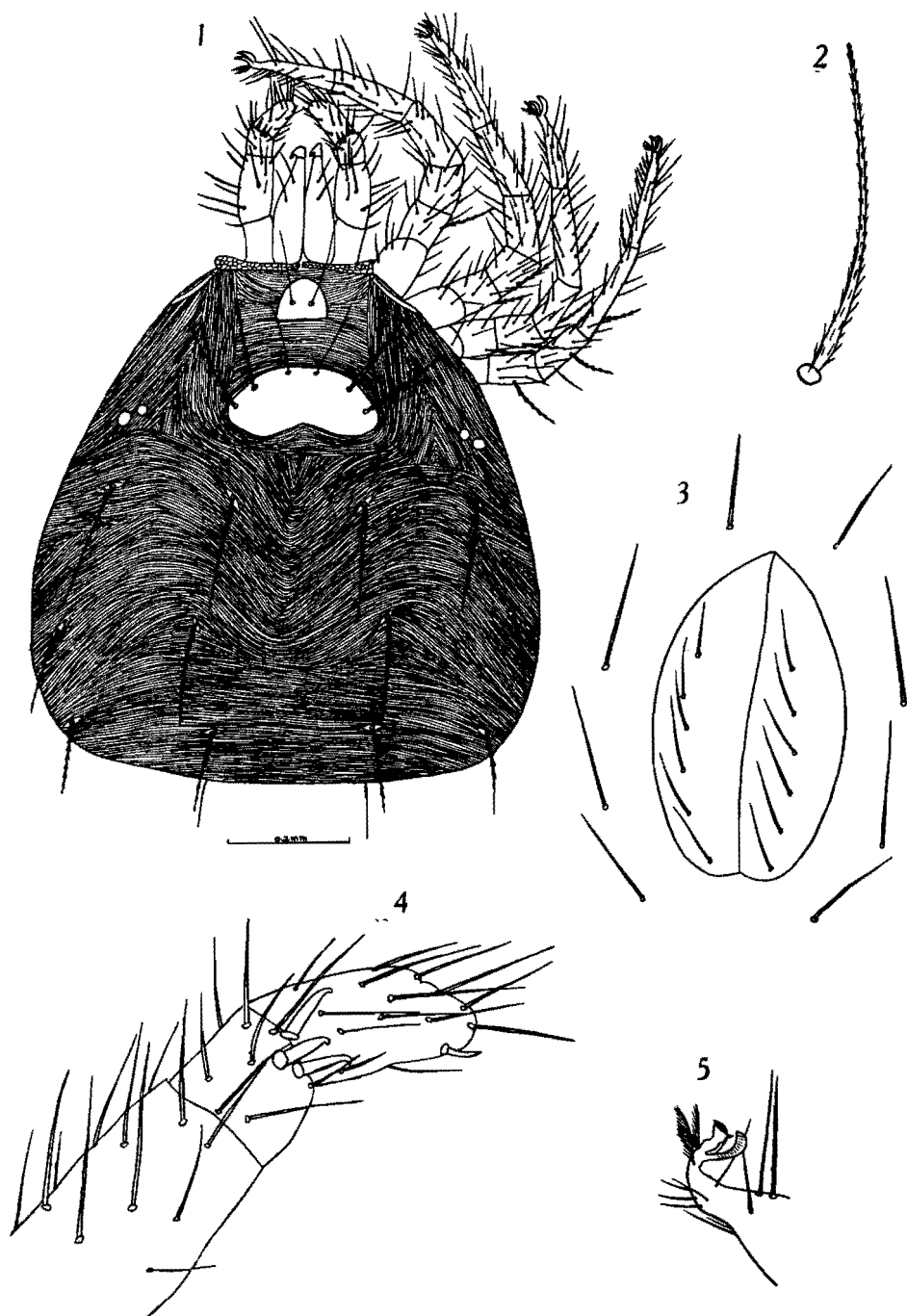
Genus ANANDIA Hirst, 1927.

This genus exhibits the following diagnostic characteristics: The propodosoma has a fairly large plate which is provided with a number of setae on or near its margin. Two pairs of eyes are present on each side of the body; the tarsi of the legs are provided with many false articulations and

LEGENDS TO THE FIGURES

Figs. 1-5. *Anystis baccharum* (Linn.), female.

Fig. 1. dorsum; fig. 2, dorsal seta; fig. 3, genital opening; fig. 4, palp; fig. 5, claw complex of leg I.



three claws, which have stout combs on each side, resembling those of the Teneriffiidae. The coxae lie close together.

Anandia bathurstensis n.sp. (Figs. 6-8).

This species differs from *A. alticola* Hirst, the only other known species in this genus, by the presence of a smaller triangular dorsal plate; its margin is also provided with fewer setae than that of the latter. The palpal tarsus appears relatively shorter than that of *A. alticola*.

Dimensions: Length of body (excluding gnathosoma) 1298 μ ; length (including gnathosoma) 1641 μ ; breadth of body 667 μ . The body is oval-shaped.

Dorsum (fig. 6). The epivertex bears two slender pseudostigmatic organs. Anteriorly the propodosoma is also provided with a relatively large, more or less triangular, plate which bears about fourteen pairs of setae on or near its margin. Two of these, near the anterior margin, represent a pair of slender pseudostigmatic setae. In *A. alticola* the plate is relatively large and not triangular in shape whereas the setae on its margin are more abundant. Two eyes are situated on each side of the dorsal plate. The interscutal membrane of the dorsum bears seventeen pairs of setae. All the dorsal setae are setose.

Venter. Owing to injury and distortion the genital opening could not be observed.

Gnathosoma. As in *A. alticola* the penultimate segment of the palp (fig. 7) bears two strong claws, the distal one being larger and provided with a double row of teeth. The palpal tarsus is relatively shorter than that of *A. alticola* but as in the latter species it also bears a claw-like spur. In addition to the spur the palpal tarsus is also provided with a number of setose setae. The chelicerae are like those of other anystids.

Legs. The fourth pair of legs are the longest and slightly longer than the body; the others are shorter than the body.

All the legs are densely covered with setose setae. The tarsi (fig. 8) are provided with false articulations and distally bear three claws which are provided with stout combs. The proximal segment of tarsi I and II each bears two small sensory spines. Ventrally the coxae are all grouped together and provided with numerous setae.

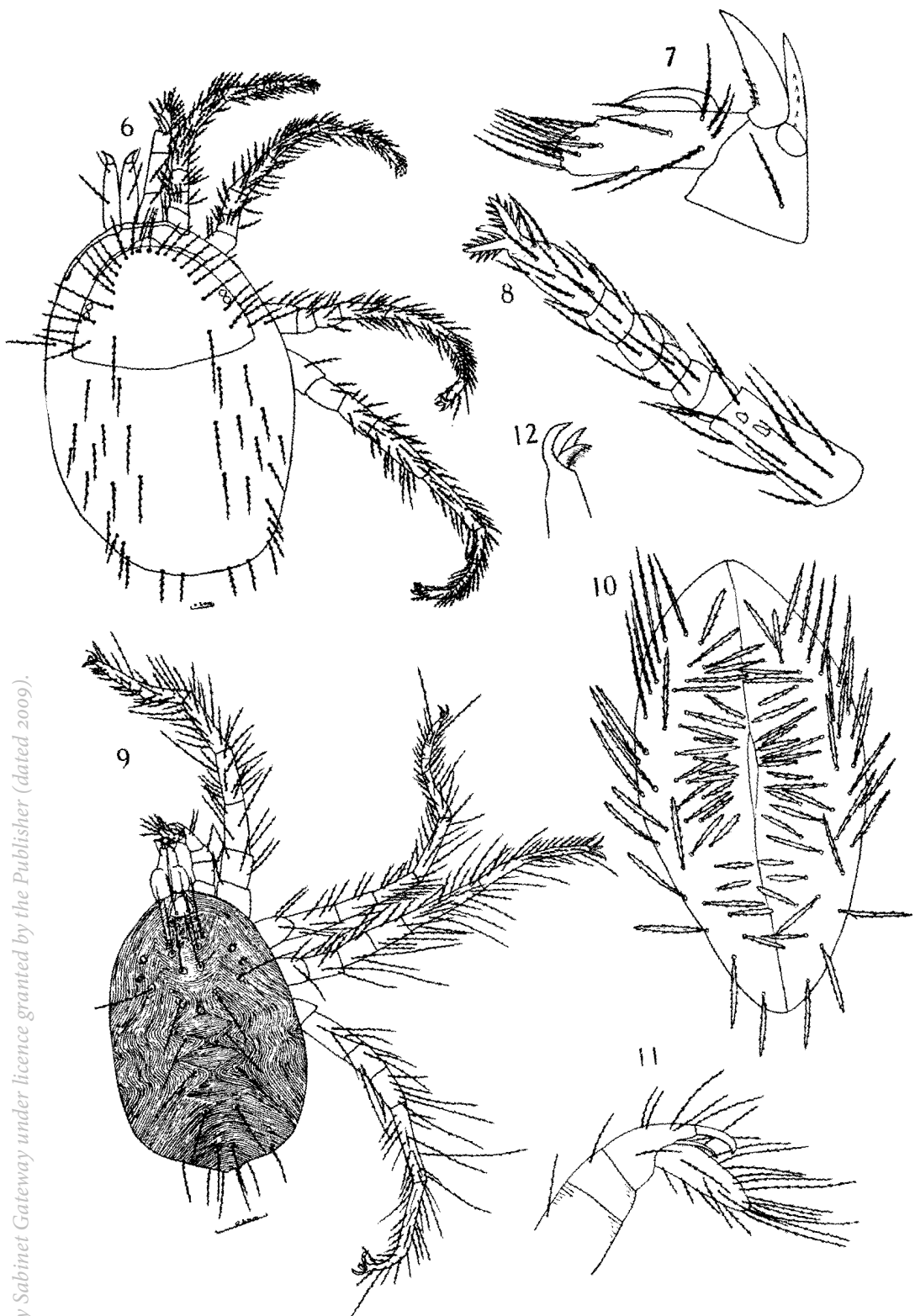
LEGENDS TO THE FIGURES.

Figs. 6-8. *Anandia bathurstensis* n.sp., adult.

Fig. 6, dorsum; fig. 7, tibia and tarsus of palp; fig. 8, tarsus I.

Figs. 9-12. *Bechsteinia grahami* n.sp., female.

Fig. 9, dorsum; fig. 10, genital opening; fig. 11, palp; fig. 12, claw complex of leg I.



Habitat and locality. The holotype from soil and grass, Bathurst (Albany Distr., C.P.), January 1956 (P. Graham).

Genus **BECHSTEINIA** Oudemans, 1936.

The mites belonging to this genus can be recognised by the absence of a dorsal plate. The peritremes which are located at the base of the chelicerae, are directed posteriorly. The chelicerae are each provided with one distal seta. The coxae are arranged in two slightly separated groups.

Bechsteinia grahami n.sp. (Figs. 9-12).

This species is longer than *B. schneideri* Oudemans 1936 and can also be separated from the latter by means of the integumental pattern on the dorsum.

Female (fig. 9).

Dimensions: Length of body (excluding gnathosoma) $974\ \mu$; length (including gnathosoma) $1223\ \mu$; breadth of body $600\ \mu$. The body is egg-shaped.

Dorsum. The epivertex carries a pair of pseudostigmatic organs. The dorsum is provided with ten pairs of finely setose setae. The two eyes on each side of the body are more widely separated than those of *B. schneideri*. The integument is finely striated. The pattern formed by the striations differs from that figured by Oudemans for *B. schneideri*. Three diamond-shaped figures are formed in the median region of the hysterosoma; these are absent in *B. schneideri*.

Venter. The genital plate is oval-shaped and is provided with many setose setae (fig. 10); in *schneideri* the plate has a more rectangular shape and bears fewer setae.

Gnathosoma. The palpal tibia is provided with two strong claws, the secondary comb-like claw being the shortest (fig. 11). The palpal tarsus measures $128\ \mu$ and is thickly covered with setose setae. The division between the palp femur and palp genu is incomplete.

In contrast to *B. schneideri* in which, according to Oudemans' description and figure, the chelicerae are shorter than the femuro-genu, they are longer in the present species. Each chelicera is provided with one short distal seta only. The peritremes are normal for the genus.

Legs. The legs are long and thickly covered with strong setose setae. The false articulations of the tarsi are inconspicuous. Each tarsus is provided with two claws and a haired empodium (fig. 12). Ventrally the coxae are grouped into two slightly separated groups.

Habitat and locality. The holotype ♀ and two ♀-paratypes from grass and soil, Bathurst (Albany Distr., C.P.), January 1956 (P. Graham).

Genus **CHAUSSIERIA** Oudemans, 1937.

In his revision of the family Anystidae Oudemans (1936) created the genus *Schellenbergia* with *Erythraeus domesticus* Koch, 1847 as the type. The name *Schellenbergia* was changed to *Chaussieria* in 1937 by the same author because the former name was pre-occupied.

This genus can be identified by the following characteristics: The dorsal plate is broader than long. The dorsal setae arise from plate-like structures. Two eyes and four lentiform organs are present on each side. The peritremata are ω -shaped. The chelicera bear two setae. The epivertex is provided with a small terminal projection. The basi- and telofemurs of all the legs are fused. The tarsus is shorter than the tibia and subdivided into a long basitarsus and a shorter telotarsus. The coxae almost touch each other along the median line.

Chaussieria capensis n.sp. (Figs. 13-16).

This species can be differentiated from the other species of this genus by the shape of the dorsal plate and the relatively short palpal tarsus.

Female (fig. 13).

Dimensions: Length of body (excluding gnathosoma) $1018\ \mu$; length (including gnathosoma) $1563\ \mu$; breadth of body $673\ \mu$. The body is more or less oval-shaped.

Dorsum. The body extends anteriorly to form a small plate or epivertex bearing a pair of pseudostigmatic organs. The epivertex is provided with a small terminal projection. The dorsal plate is shaped as figured in fig. 13. In this respect it differs from *C. maritima* Evans & Browning and *C. domesticus* (Koch). This plate is broader than long and bears three pairs of relatively long, finely setose setae. One eye is situated on each side of the lateral corner of the plate. The remainder of the dorsum is finely striated and provided with eight pairs of setose setae arising from plate-like structures. The setae become progressively shorter towards the posterior end of the body. Four pairs of lentiform organs are present on each side of the dorsum.

Venter. The genital plate (fig. 14) is long and narrow and provided with two longitudinal rows of setose setae. The external row nearly reaches to the middle of the plate whereas the internal row covers the entire distance. As in *C. venustissimus*, figured by Berlese (1882), a row of about ten to twelve setose setae are present on each side postero-laterally to the genital plate. In his description and figure Berlese has shown that these setae are only setose distally but in *C. capensis* they are entirely setose. A row of more widely spaced setose setae are present on the antero-lateral sides of the genital plate.

Gnathosoma. The palp (fig. 15) is strong and in contrast to *C. maritima*, *C. berlesei*, (Oudemans) and *C. flavus* (Dug.) it is provided with a tarsus

which is shorter than the remainder of the palp. It measures $147\ \mu$ and is thickly covered with setae, the terminal ones being the longest. In this case the terminal setae are longer than those figured for *C. venustissimus* but shorter than those of *C. maritima*. The three longest terminal setae each measures $157\ \mu$. The division between the femur and the genu of the palp is incomplete. The palpal tibia bears two strong comb-like claws, the secondary one being the shorter. The chelicerae are each provided with two setae; the proximal one is long and setose while the distal one is short and smooth. The peritreme is normal for the genus.

Legs. All the legs are longer than the body and thickly covered with strong setose setae. The tarsus (fig. 16) terminates in two claws and an empodium. Ventrally the coxae are cylindrical and almost meet each other in the middle line.

Habitat and locality. The holotype ♀ from grass and soil, Bathurst (Albany Distr., C.P.), January 1956 (P. Graham); three ♀-paratypes from clover and lucerne, Caledon (C.P.), July 1955; one ♀-paratype from oats and lucerne, Graaff-Reinet (C.P.), July 1958 (H. B. McNaughton).

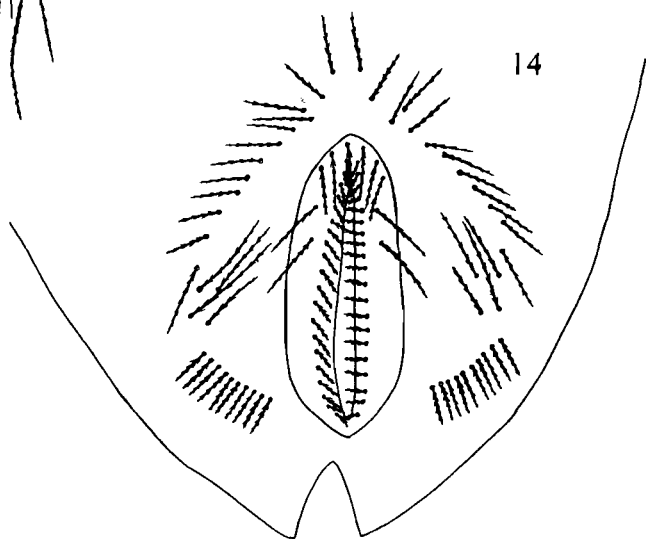
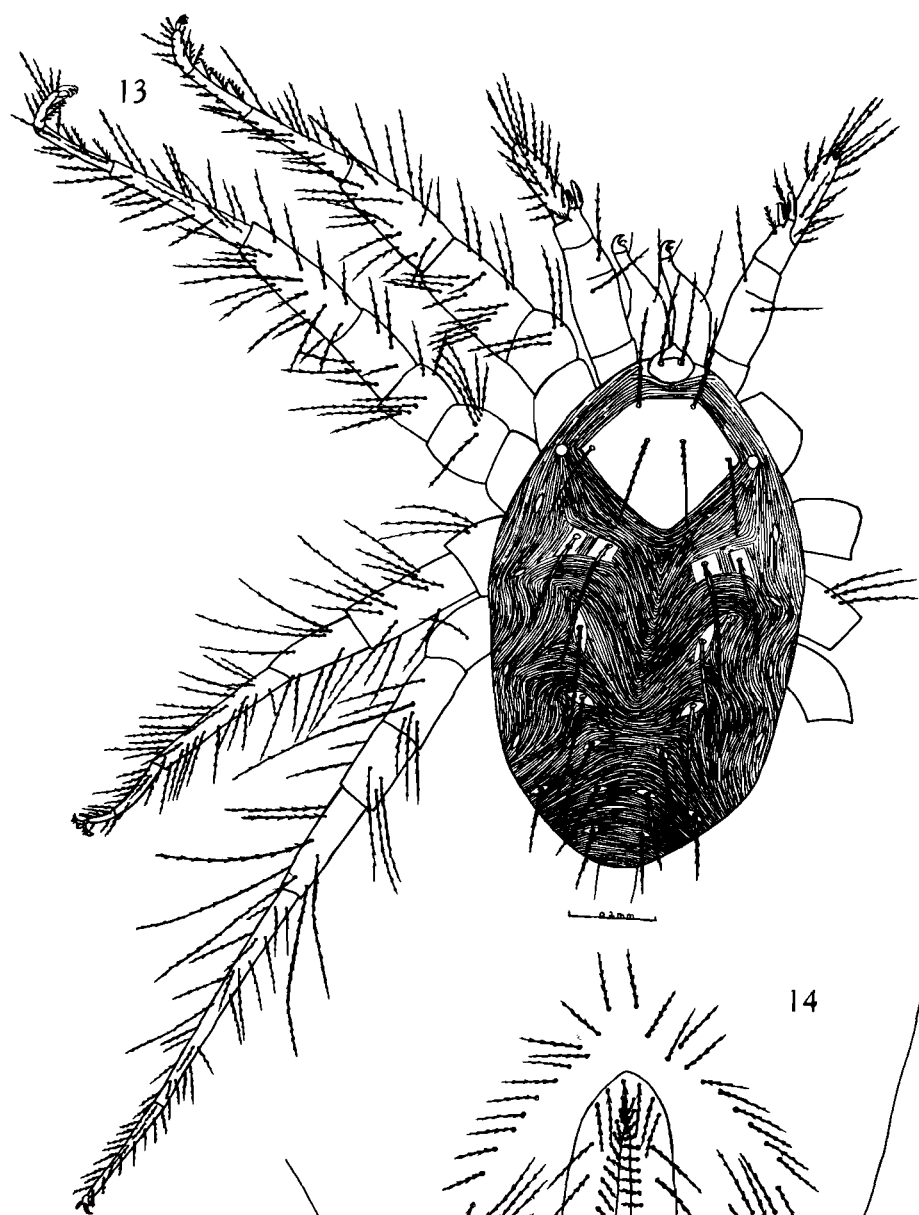
Family PSEUDOCHEYLIDAE Oudemans, 1909.

These are elongated and somewhat rhombic mites. A strong groove separates the propodosoma from the hysterosoma. A weak propodosomal plate may be present but usually it is entirely absent. The propodosoma bears two pairs of sensory setae. The genus *Heterocheylus* has only one pair of propodosomal sensory setae. The palpal femur is longer than the other segments and is thickened on the outer side with the result that the palpi are forceps-like. The palpal tibia is provided with a strong claw, and the ventral palpal tarsus may be weak. In the genera *Pseudocheylus* and *Neocheylus* the tarsi of the legs are provided either with a long stalked triangular caruncle or a sucker; claws are absent. In *Tarsocheylus* a bell-like caruncle or lobe is present between two claws or in the case of *Stigmocheylus* the empodium is absent and has normal, but very small claws on tarsi I and comb-like claws on the other tarsi. Tarsi I lack ambulacra but II, III and IV have either caruncles or only lobes. The genital suckers are absent. These mites appear to be predacious. Trägårdh (1950) divided this family into two subfamilies namely the Pseudocheylinae and Heterocheylinae.

LEGENDS TO THE FIGURES.

Figs. 13-14. *Chaussicria capensis* n.sp., female.

Fig. 13, dorsum; fig. 14, genital opening.



Subfamily PSEUDOCHEYLINAE Trägårdh, 1950.

The members of this subfamily possess stylet-like chelicerae; the palpi are each provided with a large, sharply pointed, dentate terminal tooth and a varying number of comb-shaped or sickle-shaped setae. All the legs bear claws.

Genus NEOCHEYLUS Trägårdh, 1906.

This genus is characterised by the following: The palp resembles that of *Cheyletus*; two pairs of pigment spots with a mutual cornea are present on each side of the propodosoma; the tarsi are without claws but each provided with a long stalked triangular caruncle.

Neocheylus natalensis Trägårdh, 1906.

Neocheylus natalensis has the following characteristics: The colour is red. The body is elongated. A suture is present behind the second pair of legs. The body setae and the setae of the legs are simple. Medially the palpal tarsus is provided with ten to twelve long setae. The palpi project beyond the chelicerae. According to Trägårdh (1906) the length (including gnathosoma) is 850 μ ; length of gnathosoma 170 μ ; breadth, 330 μ .

Trägårdh described this species from fresh water moss, Natal.

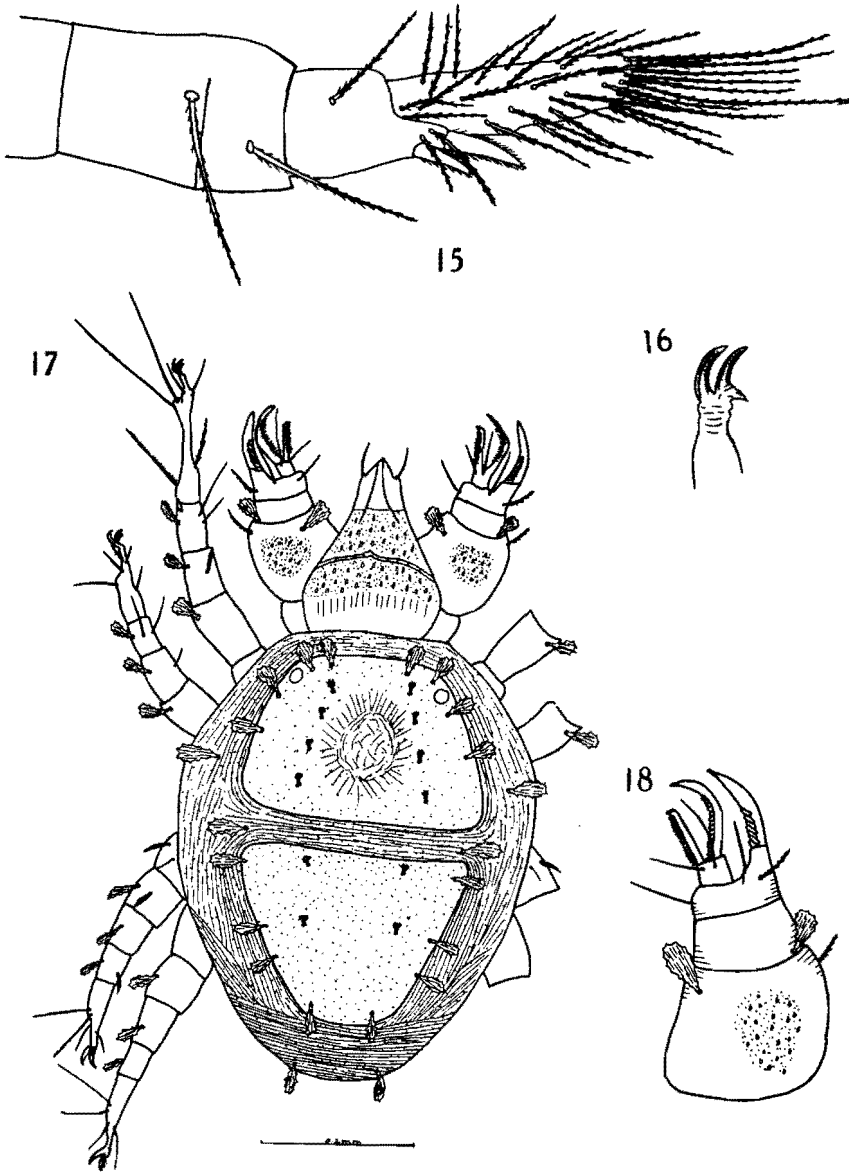
Superfamily CHEYLETOIDEA Cunliffe, 1955.

Many of the members of this superfamily possess the palpal thumb-claw complex; the movable chela is straight, stylet-like and varies in length; the basal portions of the chelicerae are fused with the gnathosoma so that they are not visible as in other groups. The families which have no palpal thumb-claw complex are a little more specialized, morphologically and biologically, than the Cheyletidae; they can be recognised by the structure of the gnathosoma, the tarsal claws and empodia and the position of the aedeagus.

This superfamily comprises the following families: Cheyletidae Leach, 1815; Myobiidae Megnin, 1877; Demodicidae Nicolet, 1855; Heterocheylidae Trägårdh, 1950.

Family CHEYLETIDAE Leach, 1815.

The Cheyletidae are prostigmatic mites which have short stylet-like chelicerae and large pincer-like palpi. A short palpal tarsus is located on the posterior part of the palpal tibia and in most cases it bears comb-like and sickle-like setae; the palpal tibia is provided with a strong claw which extends beyond the palpal tarsus. The propodosoma and the hysterosoma are usually plainly delineated and usually provided with one or more dorsal plates. The



Figs. 15-16. *Chaussieria capensis* n.sp., female.

Fig. 15, palp; fig. 16, claw complex of leg I.

Figs. 17-18. *Cheyletia wellsi* Baker, female.

Figs. 17, dorsum; fig. 18, palp.

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

- Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Reproduced by Sabinet Gateway under licence granted by the Publisher (dated 2009).

Gnathosoma. The palpi (fig. 18) are short and thick; the palpal femur is swollen and broader than long; it is provided with small dorsal tubercles and a squamiform dorsal seta. The genu has a similar seta on its posterior margin; the penultimate segment bears a strong claw which in the South African specimens is provided with seven teeth. The outer comb-like seta of the palpal tarsus is about as long as the claw and it bears approximately fifteen teeth; the inner comb on the other hand is short and bears about 20 teeth. Two simple setae also occur on the palpal tarsus. The rostrum is covered by a tuberculated plate.

Legs. The legs are short; leg I is the longest. Tarsus I is provided with two long sensory setae near its distal end; two shorter setae are situated more proximally; tibia I has a large dorsal squamiform serrate seta and a small clavate sense organ. Each tarsus is provided with two claws and an empodium.

Habitat and distribution. This species has a wide distribution but has not previously been recorded from South Africa. One female from *Citrus limonia*, Munster (Pt. Shepstone Distr., Nat.) April 1954; specimens were also found on decaying organic material between grass, Potchefstroom (Tvl.), April 1958. The specimen from *Citrus limonia* has only four pairs of staghorn-like setae on the propodosoma whereas the specimens from the grass possess five pairs as in the type species.

Genus **CHELETOMORPHA** Oudemans, 1904.

The members of this genus can readily be distinguished on account of the following: Tarsus I is attenuate at the tip and devoid of claws but provided with an empodium; leg I is used as a sensory organ; one lens-like eye is present on each side of the body; the palpal tarsus is provided with two simple sickle-like and two comb-like setae.

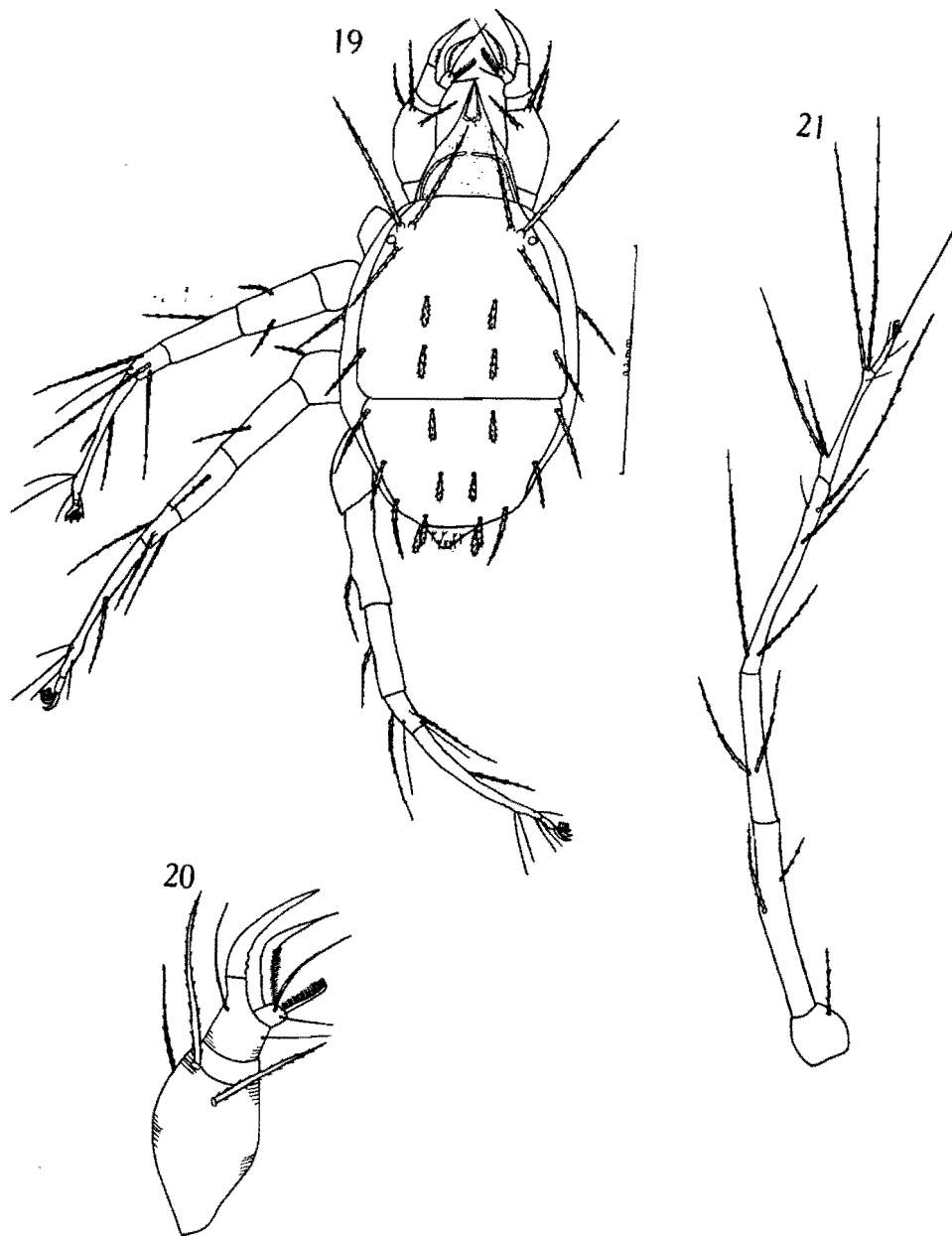
Cheletomorpha lepidopterorum (Shaw), 1794 (Figs. 19-21).

Originally described under the name *Acarus lepidopterorum*. Several synonyms such as *Cheletomorpha venustissimus* (Koch), *Cheyletus seminivorus* Packard, *C. longipes* Megnin and *C. rufus* Hardy exist.

Male (fig. 19).

Dimensions: Length of body (excluding gnathosoma) 310 μ ; length (including gnathosoma) 500 μ ; breadth of body 270 μ ; length of leg I 670 μ , leg II 374 μ , leg III 410 μ , leg IV 420 μ . This is a long-legged mite with an oval-shaped body.

Dorsum. The propodosomal plate bears three pairs of long serrate rod-like marginal setae near the eye and one pair near the posterior corner of the plate; the two pairs of submedian setae are short, spatulate and serrate; a pair of long serrate red-like scapular setae are also present.



Figs. 19-21. *Cheletomorpha lepidopterorum* (Shaw), male.
Fig. 19, dorsum; fig. 20, palp; fig. 21, leg I.

The hysterosomal plate is provided with three pairs of lateral marginal setae which are long, serrate and rod-like; the three pairs of submedian setae and the one pair of setae on the posterior margin of the body are short, spatulate and serrate.

Gnathosoma. The palpal femur is strongly swollen externally and straight internally (fig. 20); it is provided with three long, rod-like serrate setae; the palpal claw is long and slender and is provided with three small teeth. The short palpal tarsus bears an outer comb, which is about as long as the claw, an inner comb and two long simple setae; both the outer and the inner combs are provided with teeth. The rostrum is long and narrow and its sides are concave. The peritreme is simple and consists of small segments.

Legs. All the legs are longer than the body. The legs are provided with relatively long serrate rod-like setae. Tarsus I is devoid of claws but it is provided with an empodium (fig. 21).

Female. According to Baker (1949) the female is similar to the male except for its palpal claw which bears a single basal tooth; body setae are shorter than in the male; the dorsal submedian setae are short and simple.

Habitat and distribution. This cosmopolitan mite is one of the most striking species of the cheyletids. Lawrence (1954) recorded this mite from *Citrus*, Letaba, Eastern Transvaal. One male from *Ananas sativus*, Grahams-town (Albany Distr., C.P.).

REFERENCES.

- BAKER, E. W., 1949. A review of the mites of the family Cheyletidae in the United States National Museum. *Proc. U. S. nat. Mus.* 99 (3238): 267-320, pls. 6-17.
- BERLESE, A., 1882-1903. *Acari, Myriopoda et Scorpiones hucusque in Italia reperti.* Fasc. 1-101, Padua. Figs.
- LAWRENCE, R. F., 1954. The known African species of Cheyletidae and Pseudocheyletidae (Acarina, Prostigmata). *Ann. Natal. Mus.* 13 (1): 65-77, 6 figs.
- OUDEMANS, A. C., 1926-37. Kritisch historisch overzicht der Acarologie, 1 (850 B.C.-1758) *Tijdschr. Ent.* 69 (suppl.): 1-500, 70 figs.; 2 (1759-1804) *ibidem* 72 (suppl.): 1-1097, 267 figs.; 3 (1805-1850) published by author, 3379 pp., 1217 figs.
- , 1936. Neues über Anystidae (Acari). *Arch. Naturgesch.* (N.F.) 5: 364-446, 28 figs.
- TRÄGÅRDH, I., 1906. Neue Acariden aus Natal und Zululand. *Zool. Anz.* 30: 870-77.
- , 1950. Description of a new species of *Heterocheylus* Lombardini from Africa, with notes on the classification of the Pseudocheyletidae. *Ent. Tidskr.* 71 (2): 104-10, 6 figs.